UNITED STATES PATENT OFFICE.

WILLIAM W. HUNTER, OF THE UNITED STATES NAVY, AND BENJAMIN HARRIS, OF NORFOLK, VIRGINIA.

IMPROVEMENT IN THE MANNER OF CONSTRUCTING AND PROPELLING STEAM-VESSELS.

Specification forming part of Letters Patent No. **2,004**, dated March 12, 1841; antedated November 2, 1840.

To all whom it may concern:

Be it known that we, WILLIAM W. HUNTER, of the United States Navy, and BENJAMIN HARRIS, of Norfolk, Virginia, have jointly invented a new Mode of Constructing and Propelling Steam-Vessels, by which the steam-engine, water-wheel, and machinery are protected from the effect of the sea and shell-shot and any other shot discharged from cannon afloat, so that said vessel cannot be made to sink by said means; and we do hereby declare that the following is a full and exact description.

The nature of our invention consists in providing the vessel with an arched deck, called a "shield-deck," faced with iron, which facing forms, with the direction of any missile discharged from cannon afloat, an angle over one hundred and thirty-five degrees, and will therefore glance or throw off said missile. Said shield-deck, in connection with the parts of the vessel below it, gives (by its displacement of water) a buoyancy by which said vessel will float, though the vulnerable parts of said vessel be pierced or torn by shot so as to admit all the water capable of entering. The steam-engine, machinery, and water-wheels are placed below said shield-deck and every part of them below the water-line, therefore out of the reach of shot, and the water-wheels, being from their position always submerged, are relieved from the effect of the sea.

To enable others skilled in the arts to make use of our invention, we will proceed to describe its construction and operation.

See the accompanying model on the scale of ten feet to the inch, and the drawing representing a section of a steamer for harbor defense.

A A A is the water-line; B B B B, the shield-deck faced with iron and supported by wooden beams. The abutments of said shield-deck are joined and secured entirely round the vessel at a given distance below the water-line, out of the reach of shot. The summit of said shield-deck is exactly amidships and elevated the same distance above the water-line as its abutments are below it. The hatches are amidships in the summit of the shield-deck and fitted with iron or other metal water-tight slides to traverse fore and aft within the shield-deck at C C. The abutments of the shield-deck at B B are, by reason of their distance below the water-line, out of the reach of shot, and the surface of the shield-deck, being faced with iron, forming, with the direction of any missile discharged from cannon afloat, an angle over one hundred and thirty-five degrees, and as said angle will cause said missile to be glanced or thrown off from said deck it follows that part of the vessel contained under the surface of said shield-deck is secure from the effect of shot.

Compare the displacement or space contained between that part of the water-line, that part of the inner surface of the vessel's side, and that part of the surface of the shield-deck at H H to that contained between the part of the water-line and part of the surface of the shield-deck at K K K, and it is evident, should the side be so pierced or torn by shot as to fill the first-named displacement or space at H H with water being all the water that can possibly be admitted, the vessel will settle just so much as that weight of water will occasion and no more, leaving to the vessel the buoyancy occasioned by the greater displacement or space contained between K K K less the weight of water at H H. Said vessel therefore cannot be made to sink by the means named in the premises, and the steam-engine and machinery will be protected by said means.

The water-wheels of said vessel revolve horizontally under water, the hub M and inner paddles of each wheel in the vessel, in wheel-openings made therefor, fitting the wheel as near as may be to avoid contact and consequently friction. The water-wheels should be made of metal and consist of a hollow water-tight hub M and paddles R. Said wheels are either fixed permanently or made to be detached at pleasure from a vertical shaft passing through the floor of the vessel, and in said floor, which is made of stout timber, there is a pedestal and stuffing-box, the first to support the shaft firmly in its position, and in which it also revolves, and the latter to exclude the water. The lower ends of said shafts L are in the shape of an inverted cone and made of metal properly tempered to diminish friction. Said shaft ends revolve in metal saucers fixed in the bottom of the wheel-openings. The upper ends of